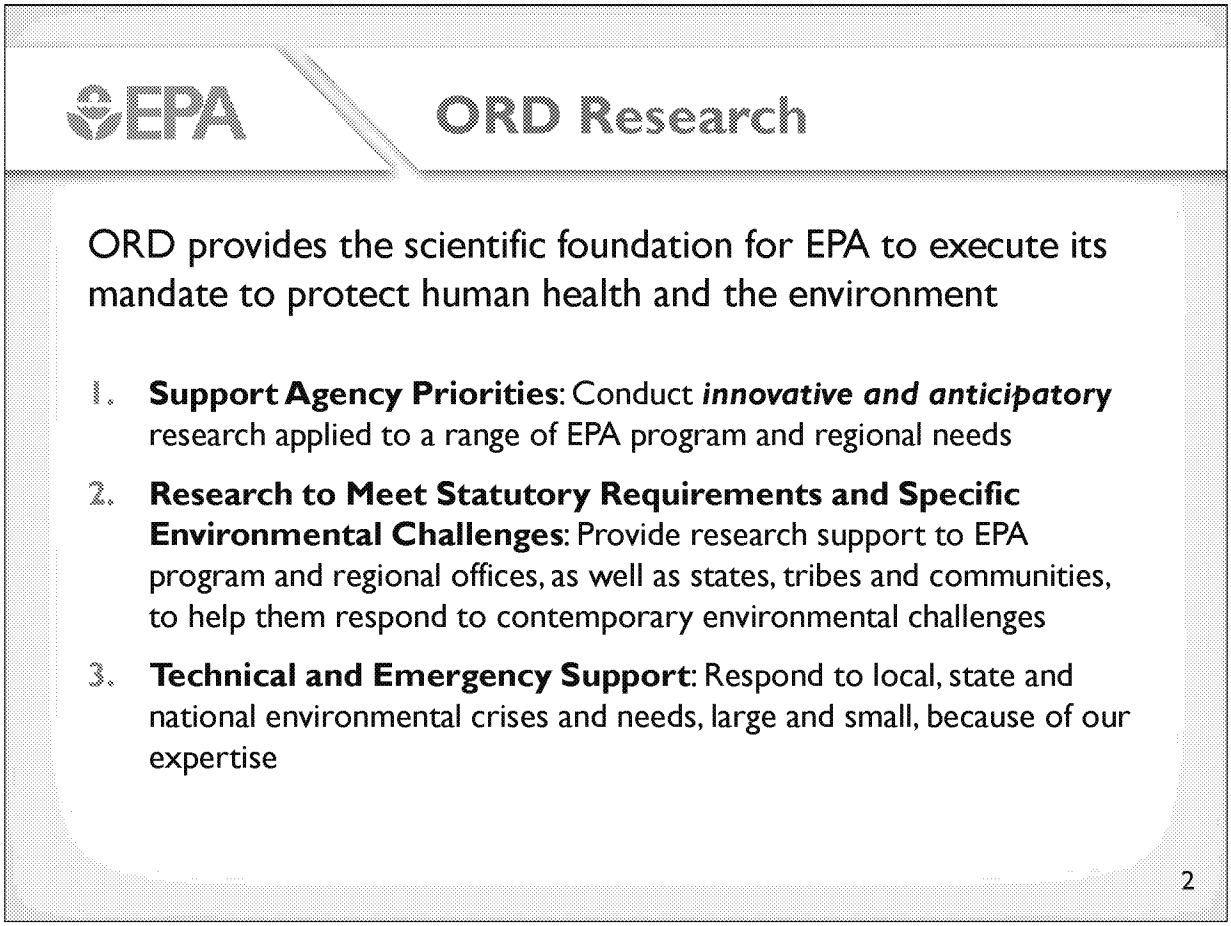
EPA

ORD Research Programs

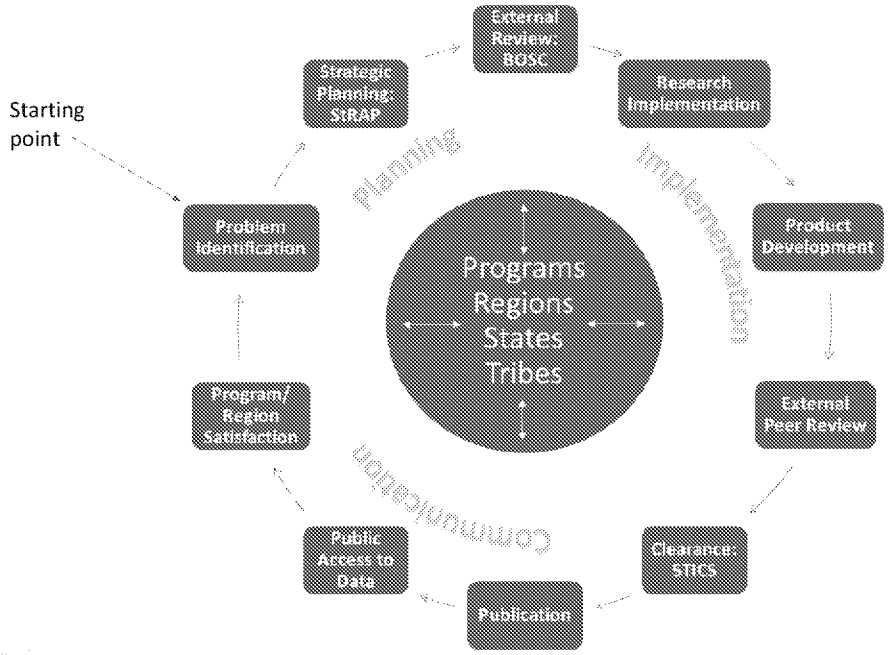


Longer Term Research examples:
Computational Toxicology applies cutting-edge technologies to efficiently and economically evaluate the safety of thousands of chemicals currently in use.
Advances in decontamination research, including evaluating chem/bio/rad decontamination techniques in real-world situations to measure the costs and effectiveness of each method

Research on Specific Environmental Challenges examples:
Studying the potential hazards of PFAS in the environment
Providing research expertise to evaluate chemicals to support TSCA
Monitoring algal blooms and building an early warning indicator system

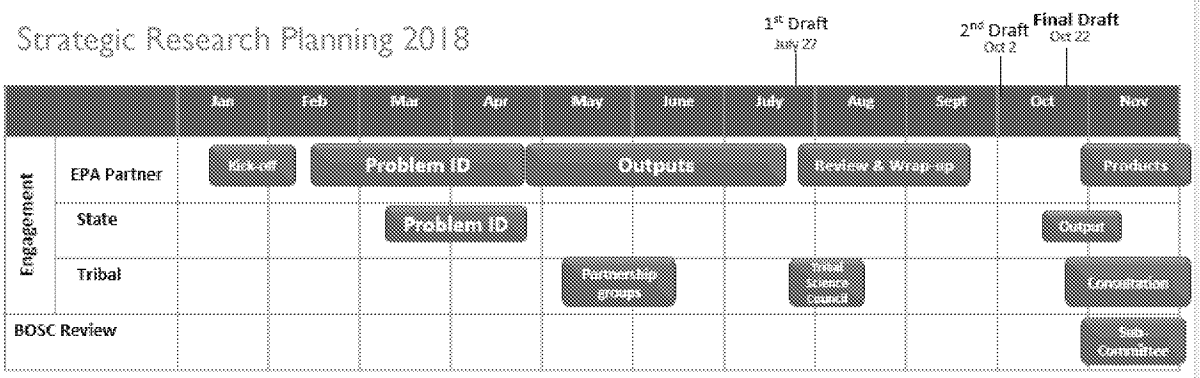
Technical and Emergency Support Examples:
Assisting Toledo, Ohio in controlling the cyanobacteria in their water treatment plant and distribution systems, and giving them the scientific assistance to inform the "Do Not Drink" order for the city
Researching methods to better identify lead service lines and helping states and regions review corrosion control plans in response to lead emergencies in Flint and other cities.

ORD Research Cycle



Problem Identification

Strategic Research Planning 2018



EPA Programs/Regions

- Kick-off
  - DAA to DAA/DRA
- Problem Identification and Research Needs
  - National Research Programs, as a group, met with Program Office senior management, including Lead Region Coordination
    - i. What are the environmental problems?
    - ii. What are the priorities?
    - iii. When is the research needed?
- Research Area and Output Development
  - Meetings with Office Directors and staff
  - Workshops
- Review & Wrap-up
  - Program and Regional Offices provide comments
  - AA/DAA meetings

States

- ECOS/ERIS conduct survey
- Problem ID and Research Needs
  - NPDs met with interested states - 4 media meetings; include EPA Program and Regional partners
- Output Development
  - StRAP review and discussion

Tribal

- Problem ID and Research Needs
  - Partnership groups - NPDs met with 6 EPA tribal partnership groups
  - Tribal Science Council (TSC) - All NPDs met with TSC to provide overview and discuss priorities

Strategic Planning: StRAP

Strategic Research Action Plans (StRAP) for FY19-22 in Preparation—Priority Research Areas are:

SSWR
- Water Treatment and Infrastructure
- Nutrients & Harmful Algal Blooms
- Watersheds

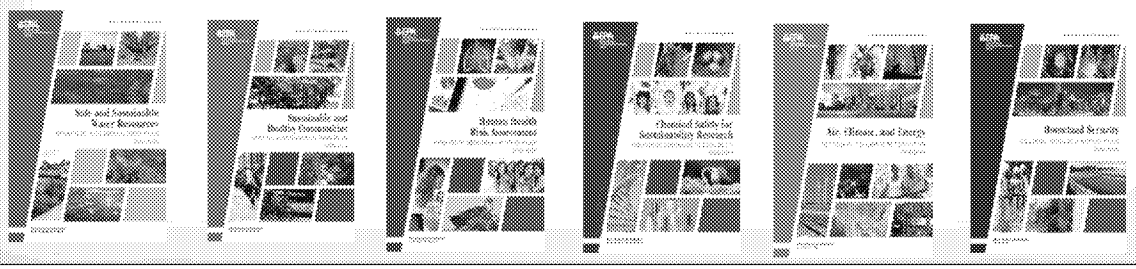
SHC
- Contaminated Sites
- Waste & Materials Management
- Healthy Communities

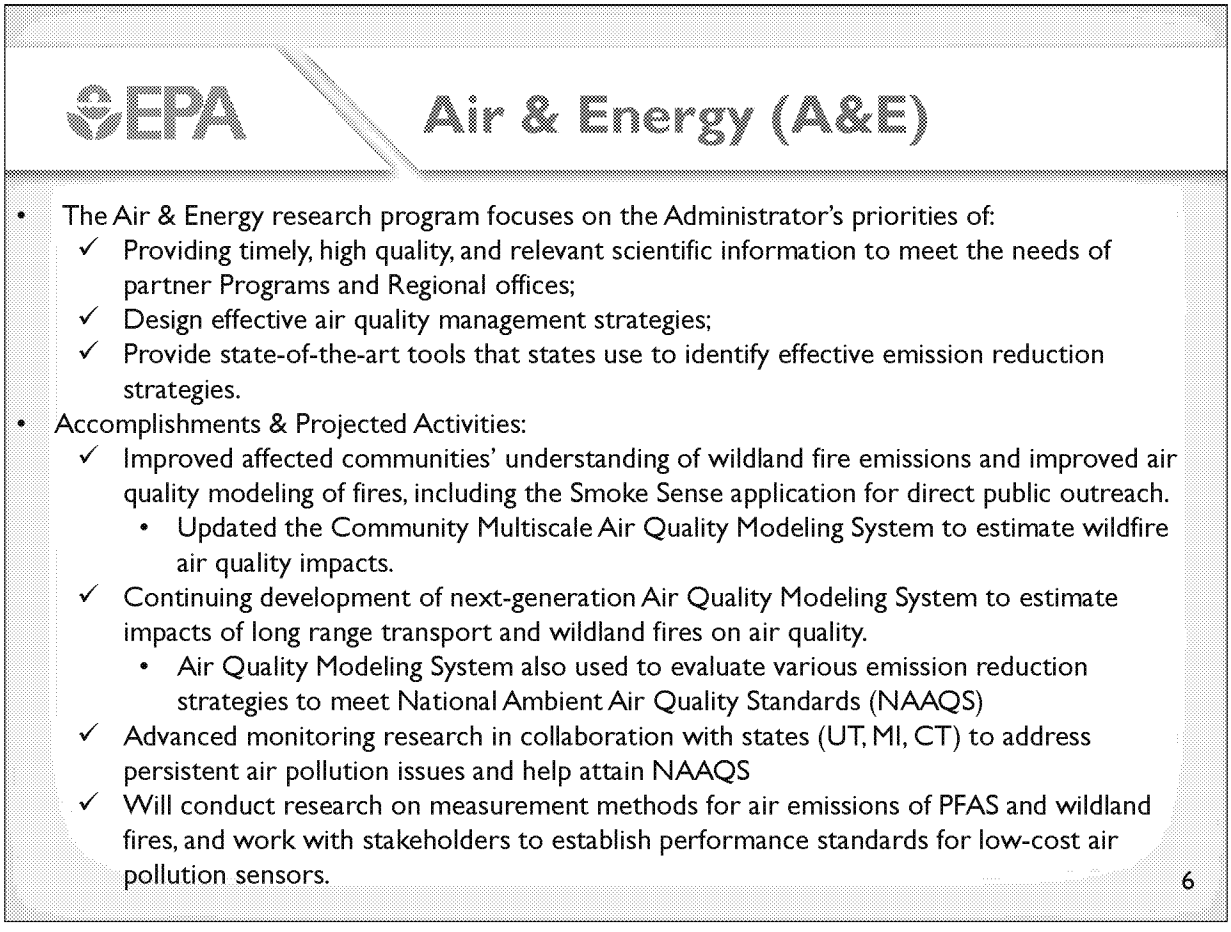
HHRA
- Science Assessments & Translation
- Advancing Practice of Risk Assessment

CSS
- Improved Chemical Evaluations to Support Agency Decisions
- Complex Systems Science to Inform Agency Understanding of Chemicals
- Solutions and Delivery of Chemical Knowledge to Agency Partners

A&E
- Science for Air Quality Decisions
- Extreme Events & Emerging Risk
- Next Generation Methods to Improve Public Health & Environment

HSRP
- Contaminant Characterization & Consequence Assessment
- Environmental Cleanup & Infrastructure Remediation
- Preparedness & Response





Additional information for A&E intro paragraph:
The States and EPA are challenged to design effective air quality management strategies due to increased urbanization, higher temperatures, and a growing demand for publicly accessible data.
State-of-the-art tools are used to identify effective emission reduction strategies, per the National Ambient Air Quality Standards (NAAQS).
Research enhances air quality measurement methods used to ascertain compliance with the NAAQS.

Accomplishments & Projected Activities paragraph:
Wildland fire is a growing national air quality issue which has seen annual expansion of land area burned and economic and environmental impacts over the last 15 years.
EPA is providing leadership on this issue by conducting research to improve affected communities' understanding of wildland fire emissions and improve air quality modeling of wildland fires.

Deliberative Process / Ex. 5

Sustainable & Healthy Communities (SHC)

- The Sustainable & Healthy Communities (SHC) research program focuses on the Administrator's priorities of:
  - ✓ Remediating and revitalizing contaminated sites;
  - ✓ Understanding the relationship between environmental quality and public health, especially in vulnerable groups (children and EJ communities);
  - ✓ Managing wastes in a beneficial manner to prevent land, water & air contamination;
  - ✓ Reporting on the status & trends of environmental conditions through the ROE

- Accomplishments & Projected Activities:
  - ✓ Research on Contaminated Sites
    - Innovative technologies for site characterization & remediation
    - Contaminated groundwater & sediments – a critical issue at 85% of sites
    - Technical Support Centers - Responding to over 400 requests/yr
  - ✓ Lead Exposure Modeling to Protect Children's Health and identify locations of high exposure risk
  - ✓ Aid State & Local design of site remediation and restoration to benefit public health
  - ✓ Continue to Update the Report on the Environment (ROE)

Deliberative Process / Ex. 5

Safe & Sustainable Water Resources (SSWR)

The Safe & Sustainable Water Resources (SSWR) research program focuses on the Administrator's priorities of:

- ✓ Developing reliable and cost-effective solutions for current, emerging and long-term water infrastructures and resources challenges;
- ✓ Informing policy making and assistance to states.

Accomplishments & Projected Activities:

- ✓ Per- and Polyfluoroalkyl Substances (PFAS) – Develop and validate methods for 24 PFAS in groundwater, surface water, wastewater, and solids (soil, sediment and biosolids) to help risk assessors meet current and future federal health advisory guidelines or state regulations. Assess consequences from land application of biosolids containing PFAS on water resources.
- ✓ Lead – Improve sampling schemes to identify and locate lead sources in distribution systems and premise plumbing. Evaluate the effectiveness of current corrosion control practices and, if needed, optimize corrosion control to minimize lead release. Improve existing risk exposure models in support of the Office of Water's Lead and Copper Rule revisions.
- ✓ Antibiotic Resistant Bacteria – Develop methods to characterize the type and 'hot spot' locations of antimicrobial resistance (AMR) in surface waters and assess AMR-related human health effects.
- ✓ Harmful Algal Blooms (HABs): Develop tools to reduce (a) health impacts to humans, pets, livestock and ecosystems, and (b) economic impacts from increased health care & drinking water treatment costs and reduced revenue from tourism, recreation, and commercial fishing. Optimize field sensing technology to characterize inland, freshwater HABs. Develop real-time toxicity monitoring for rapid response. Characterize health effects of HAB toxins. Empower decision makers with satellite monitoring & assessment methods to predict & manage HABs.

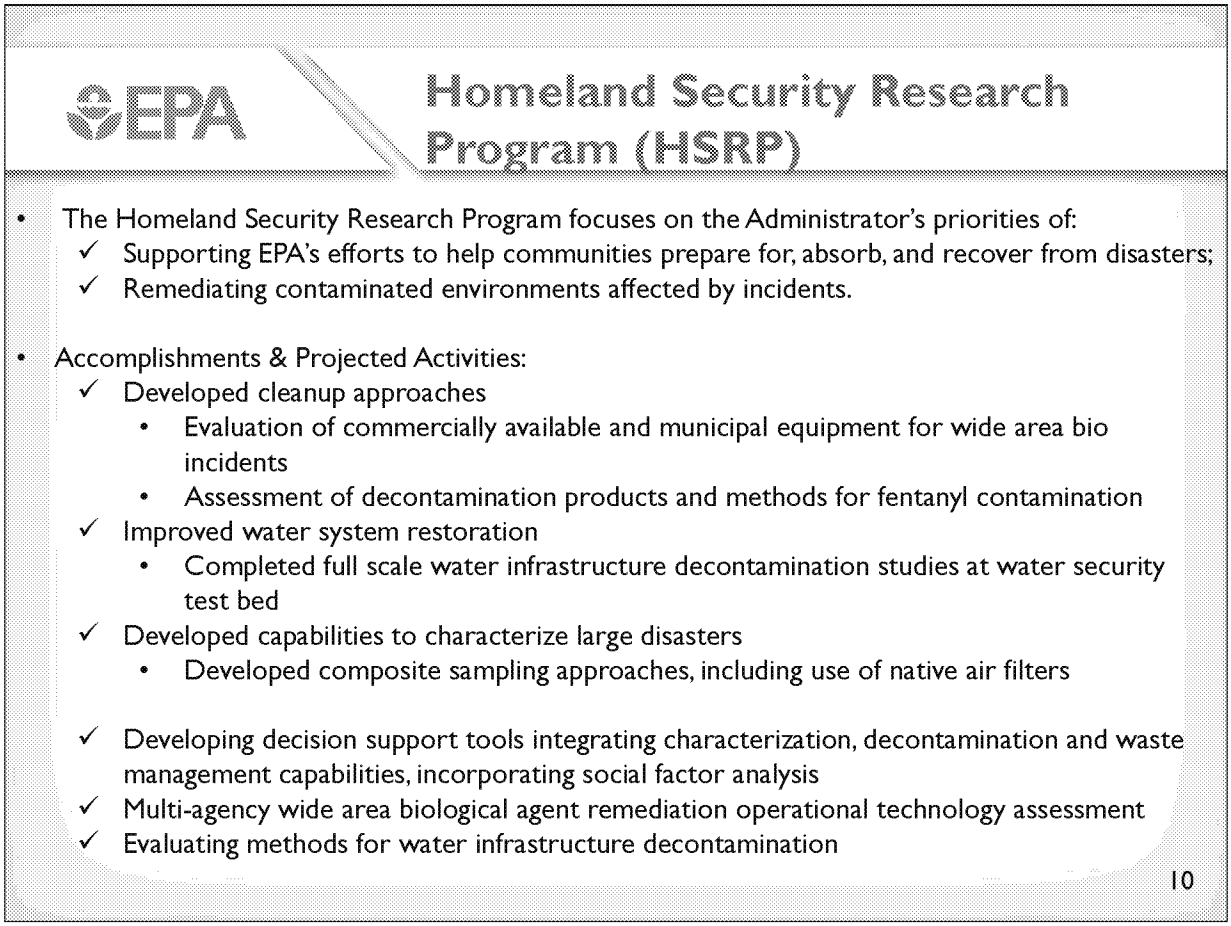
ED_002262_00000069-00008

Chemical Safety for Sustainability (CSS)

- The Chemical Safety for Sustainability (CSS) research program focuses on the Administrator's priorities of:
  - ✓ Making better informed, timely decisions about chemicals, many of which have not been thoroughly evaluated for potential risks to human or ecological health, by providing methods, data, information, and tools.
  - ✓ Accelerate the pace of data-driven evaluations and strengthen the Agency's ability predict impacts from the use and disposal of manufactured chemicals.
- Accomplishments & Projected Activities:
  - ✓ Providing direct support for implementation of alternative toxicity testing, chemical prioritization and chemical evaluation activities required by TSCA (ongoing – also supports FIFRA, SDWA).
  - ✓ Developing and implementing an integrated approach to detect, measure, and evaluate impacts of PFAS chemicals in support of Agency partners and external stakeholders (ongoing)
  - ✓ Deploying new digital tools to provide comprehensive chemical safety information to decision-makers (CompTox Chemistry Dashboard, ECOTOX Knowledgebase, SeqAPASS, CPDAT) (ongoing).
  - ✓ Expanding breadth and depth of information on chemical toxicity and exposure using high throughout, new approach methodologies (NAMs) in support of agency implementation of TSCA, FIFRA, FQPA, SDWA (ongoing)

9

Deliberative Process / Ex. 5



Additional information for HS intro paragraph:
EPA's efforts to help communities prepare for, absorb, and recover from disasters safeguards their economic, environmental and social wellbeing.
Incidents such as terrorist attacks, industrial accidents, or natural disasters can contaminate environments, which EPA is mandated to cleanup, per direction by Presidential Directives.

Accomplishments & Projected Activities:
Developed cleanup approaches
Evaluation of commercially available and municipal equipment for wide area bio incidents – assessment of available equipment that can utilized to support urban, wide-area cleanup after a CBR incident
Assessment of decontamination products and methods for fentanyl contamination – evaluation of decontamination methods for indoor contamination with fentanyl and its analogs
Improved water system restoration
Completed full scale water infrastructure decontamination studies at water security test bed – for CBR contaminants looking at decontamination methods and on-site water treatment methods
Developed capabilities to characterize large disasters
Developed composite sampling approaches, including use of native air filters – developed methods to support rapidly characterizing contamination after a wide area biological incident

Developing decision support tools integrating characterization, decontamination and waste management capabilities, incorporating social factor analysis – holistic tools for decision support, integrating tools developed in for characterization, decontamination, and waste management

Multi-agency wide area biological agent remediation operational technology assessment – DHS/EPA interagency AnCOR effort

Evaluating methods for water infrastructure decontamination – evaluation of methods for additional CBR threats in water infrastructure.

Deliberative Process / Ex. 5

Human Health Risk Assessment (HHRA)

- The Human Health Risk Assessment (HHRA) research program focuses on the Administrator's priorities of:
  - ✓ Sustaining EPA's commitment to developing agile, fit-for-purpose portfolio of robust and responsive scientific assessment products that characterize risks and potential impacts to human health and the environment;
  - ✓ Applying scientific assessments to inform EPA actions on safety of chemicals; cleaning up, revitalizing and returning land back to communities; providing clean and safe water; and improving air quality;
  - ✓ Applying rapid risk assessment tools to respond to emerging, often crisis-level environmental contamination issues.
- Accomplishments & Projected Activities:
  - ✓ Posted final IRIS assessments for RDX
  - ✓ Released draft assessment for PFBS
  - ✓ Released three ISAs to support NAAQS: 1) draft PM – health; and 2) draft Oxides of nitrogen, oxides of sulfur and PM – ecological; and 3) final oxides of sulfur – health criteria
  - ✓ Released five PPRTVs to inform decisions at contaminated and hazardous waste sites
  - ✓ Providing technical support to deliver safe drinking water, with focus on known and emerging chemical contaminants, such as perchlorate and PFAs

11

Deliberative Process / Ex. 5